Video Facilitator's Guide

Grade 5

Finding Area and Perimeter

Highlighted Process Standards for Mathematics

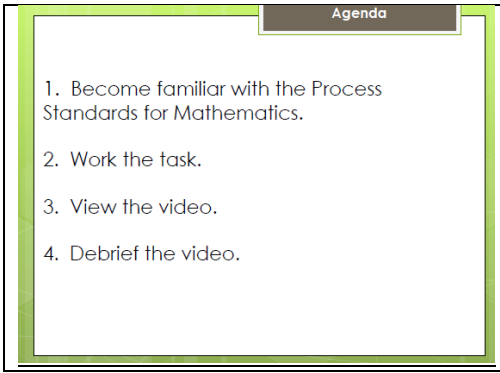
- #1 – Make sense of problems and persevere in solving them.
- #3 – Construct viable arguments and critique the reasoning of others.
- #4 – Model with mathematics.
- #5 – Use appropriate tools strategically.
- #6 – Attend to precision.
- #7 – Look for and make use of structure.

Summary of Video

In this lesson, the teacher gives students a task to build several countertops using 3-inch by 6-inch tiles. Each countertop has specific measurements and the students must determine if they can make it using whole tiles given without overlap or partial pieces. The students must calculate area and perimeter and provide an explanation about how they can figure out whether a given countertop can be covered with the tiles. This lesson is focused on a 4th grade standard to scaffold instruction to the 5th grade measurement standard.

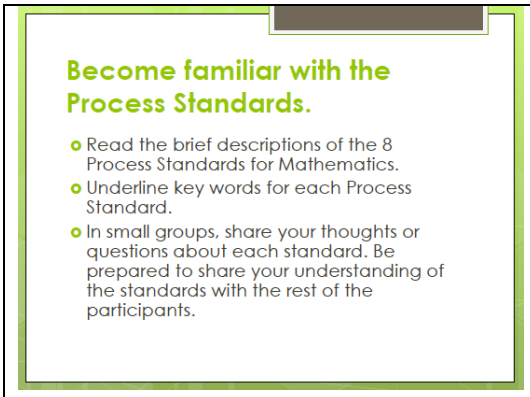
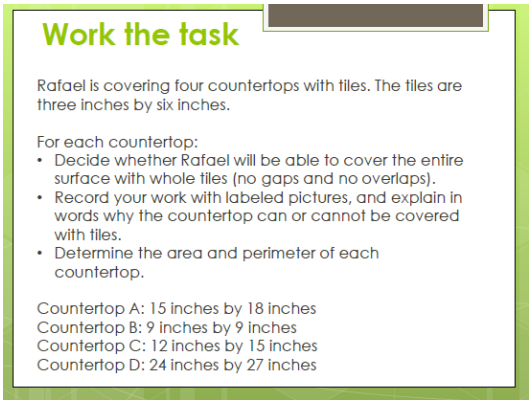
Prepare for Facilitation

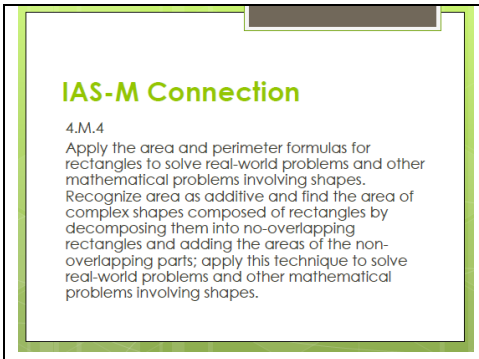
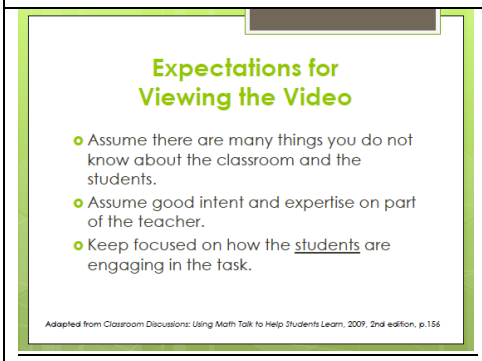
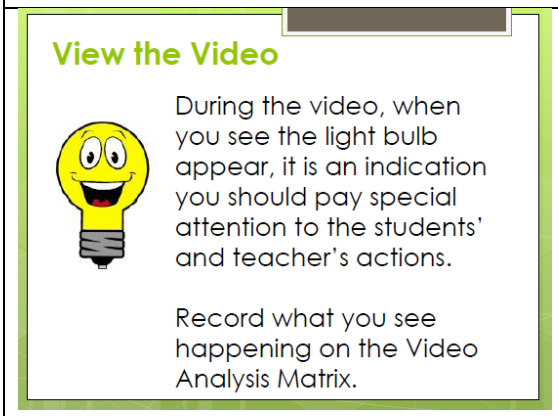
Make sure that you do the following before your presentation:
1. Read Facilitator's Guide Overview and this document that is specific to the Finding Area and Perimeter video.
2. Download the video onto desktop of computer.
3. Make copies of handouts.
4. Create 3-inch-by-6-inch paper strips. (Optional)
5. Review the Process Standards for Mathematics.
6. Review PowerPoint slides provided.
7. Ensure that the presentation room includes appropriate audio and video equipment for showing video.

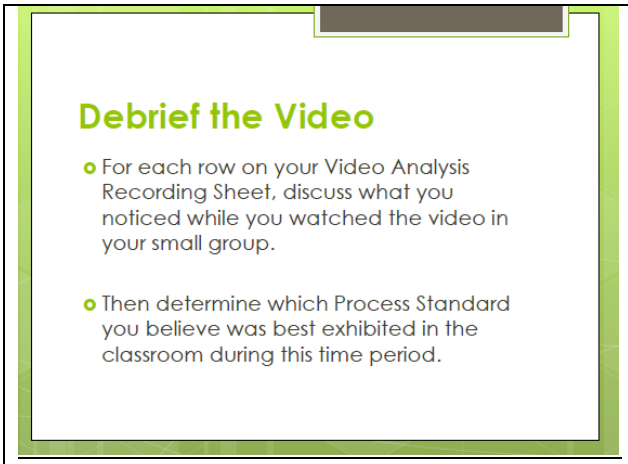


Agenda

Briefly share the agenda for the session. Remind participants that the purpose of this session is to introduce teachers to the Process Standards for Mathematics and observe how the standards are enacted in the elementary classroom.

	*Process Standards for Mathematics (PS)* Pass out handout entitled "Brief Version of Process Standards for Mathematics". Have participants read the descriptions of the eight Process Standards for Mathematics. As they read, have them underline key words for each of the eight standards. After everyone has finished, have the participants get into small groups to share their thoughts about each PS. After sufficient time has passed, debrief the findings in whole group discussion. One way to do this would be to ask each group to share their thoughts on one PS, until all groups have shared or all PS have been discussed. As each group shares, ask for additional input from other small groups and/or add your own ideas, if necessary, to clarify the intent of each practice. Note: This step may be optional if the participants are already familiar with the PS or have participated in other video reviews from the *Process Standards for Mathematics in Action!* series.
	*Work the Task* Provide participants with a copy of the task. It may help participants to provide 3-inch-by-6-inch paper strips. Read the word problem from the slide, and ask participants to work the task individually. As participants are working the task, ensure that participants are drawing and labeling appropriate sketches. After everyone has completed the task: - have one participant share his/her response with the rest of the participants. - ask ~~the participant~~participants whether they found a method to determine whether the countertop could be covered with whole tiles (e.g., they may see that the countertop can be covered when one of the side lengths is a multiple of 6 and the other side length is a multiple of 3). - discuss potential barriers that children may face when asked to solve this problem.
	Connect to IAS for Mathematics Ask participants to consider the potential of this task to support the development of the content necessary for children to meet the standards in the slide at the

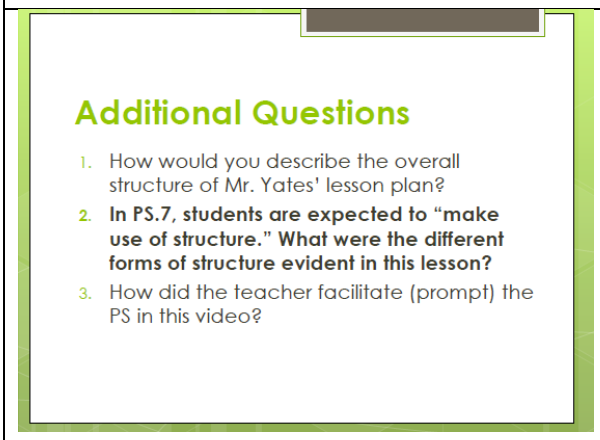
	left. Note: The video for this session was recorded in a fifth-grade classroom when the 2000 Indiana Academic Standards were still in use. These concepts are now addressed in Grade 4 in the Indiana's Academic Standards.
	*Expectations for Viewing Video* Go over the following expectations before viewing the video. 1. Assume that there are many things you do not know about the students, the classroom, and the shared history of the teacher and students on the video. 2. Assume good intent and expertise on the part of the teacher. If you cannot understand his or her actions, try to hypothesize what might have motivated him or her. 3. Keep focused on how the students are engaging in the task(s) and whether they are interacting in ways that align with the PS.
	*Viewing the Video* Before viewing the video, distribute the Video Analysis Matrix. Explain that when the participants notice the light bulb icon, they should begin watching for teacher and student actions that align with one or more of the mathematical practices. View the video together. You may want to pause the video briefly at the end of each time period when an icon is displayed to allow participants time to note their ideas on the Matrix. (See sample matrix in this facilitator's guide for when each time period ends.)



Video Debriefing:

After watching the video, ask participants to share in small groups what they noticed for each time period listed in the Video Analysis Matrix. Ask participants to add a third column to the matrix in which they identify the possible PS that are exhibited.

After sufficient time has passed, ask if anyone is willing to share his/her PS, supporting it with evidence from the video. Repeat this process for each time period. If necessary, have teachers re-watch segments of the video. Explain to the participants there may be differing opinions about which PS is most prominent; however, each PS mentioned must be justified using evidence from the video. If necessary, have the participants refer back to the wording of the PS to clarify its meaning. (For large groups of participants, consider the use of small-group discussion prior to whole-group discussion.) Remember that student and teacher actions may be interpreted in different ways, so there are no "right" answers, although the table does provide sample responses. The goal of documenting evidence of the PS is to provoke teacher reflection and discussion about the PS.



Additional Questions:

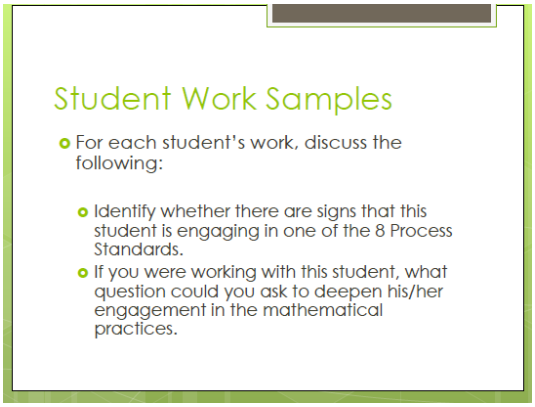
If time allows, follow up the discussion of the PS with one or more of these questions:

1. How would you describe the structure of Mr. Yates' lesson plan?

   Possible answer: Mr. Yates followed a three-part lesson plan. The first part of the lesson focused on launching the task to ensure that all students understood the problem and were prepared to engage in the activity. The second part of the lesson focused on student exploration, which consisted of small groups and pairs of students who worked collaboratively to solve the problems. The final part of the lesson included a summarization time when the students were able to share their possible solutions to the problem and identify key ideas.

2. In PS.7, students are expected to "make use of structure." What were the different forms of structure evident in this lesson?

   Possible answer: Students in Mr. Yates' class were attending to two kinds of structure: numerical

	structure and geometric structure. Numerically, they were looking for patterns in the numbers (e.g., 3, 6, 9, etc.) and determining whether a number could be decomposed into a factor pair including 3 or 6. Geometrically, the students were using the idea that rectangles can be decomposed into rows and columns of smaller rectangles. 3. How did the teacher facilitate (prompt) the PS in this video? *Possible answer: Mr. Yates often prompted students to explain why, which is a prompt for them to construct an argument. He also attended to the precision of the language and written work of his students.*
	<u>*Student Work Samples:*</u> This part of the session is optional. Ask participants to view each student's work. Use the two questions from the PowerPoint to guide participants' discussions. Below are some comments about each solution. **Student A:** Although this student has constructed an argument (PS.3), the explanation lacks specificity. **Student B:** This student also has an argument (PS.3) that could be strengthened by focusing on mathematical concepts. Note that the student could also be asked to attend to precision (PS.6) in the label for area. **Student C:** Note that this student has assumed that the reader has oriented the tiles in the same way he/she did. **Student D:** Like students in the video, this student has likely used structure (PS.7) to develop a generalization. **Student E:** This student's labeling of the sides helps others to see the length of each side in inches, but it is more difficult to see the groups of 3 and 6 inches. **Student F:** This student, in contrast to Student E, has labeled the side lengths to attend to both the individual inches as units and also to the units created by the lengths of 3 inches and 6 inches. Being able to map relationships in diagrams is suggested by PS.4.

.

SAMPLE COMPLETED VIDEO ANALYSIS MATRIX

Video Clue	Evidence of Student and Teacher Actions	Process Standard In Action
1:35-2:59  1	Mr. Yates helps students to make sense of the problem by discussing terms that may be unfamiliar, such as "countertop." The task requires students to think mathematically to solve problems that might arise in everyday life (tiling countertops).	#1 Make sense of problems and persevere in solving problems #4 Model with mathematics
8:47-9:31  2	Mr. Yates helps students to focus on argumentation by: • focusing students on conceptual issues related to area, such as having no overlaps or gaps; • telling student that "For your explanation, if you say yes, you say why;" • referencing students to think about how they explain themselves to someone who doesn't know about the problem; • accepting students' viable answers and probing them to further their thinking; • asking students to explain by saying, "3-inch by 6-inch tiles fit into this 15 by 18-inch countertop, because…" and then allowing students to finish the argument.	#3 Construct viable arguments and critique the reasoning of others
10:37-10:50  3	Mr. Yates helps students learn to work together to use the yardstick to create the model on the table.	#5 Use appropriate tools strategically
11:33-13:07  4	Mr. Yates ensures students is building on this practice by • reminding students to focus on the question, which asked them to reason about the tiles. • not accepting students' answers only, but asking probing questions, such as "Why not?" • stating a claim, and asking students	#3 Construct viable arguments and critique the reasoning of others

	to extend by saying, "because…"	
13:17-  5	Mr. Yates focuses students on patterns and structure in their work on the 12-inch by 15-inch countertop by • Asking students to think about the problem without using the drawing and tile by thinking about the whole-number side lengths in terms of their factor pairs • Asking students to explain their thinking to provide insight for other students.	#7 Look for and make use of structure
14:17-14:41  6	The student's response suggests he has identified a pattern based on the structure of the numbers in the countertops. The teacher suggests this is connected to a generalizable argument about the countertops' side lengths.	#3 Construct viable arguments and critique the reasoning of others #7 Look for and make use of structure
15:13-16:35  7	Mr. Yates is prompted students to attend to precision in as they • use language in talking about a square vs. a rectangle • label sides using the measure of unit (i.e., inches) • calculate the perimeter of a rectangle.	#6 Attend to precision
17:33-17:49  8	The student here is discussing patterns (e.g., multiples of 3) in the problem that he noticed.	#7 Look for and make use of structure